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Tornado®

Operation & Maintenance Manual

For Commercial Use Only

The DS Series of 175 RPM Floor Maintenance Machines

MODEL NOS.

97580, 97580C, 97585 & 97585C (115V, 60Hz)
97581 & 97586 (230V, 50Hz)

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NOTES

This instruction book covers:

CATALOG NO.	97580	97580C	97581
SERIES	D	A	D
SIZE	17” (43cm) Steel base	17” (43cm) Steel base	17” (43cm) Steel base
HORSE POWER	1-1/2	1-1/2	1-1/2
VOLTS	115V	115V	230V
AMPS	6	6	3
MANUAL SOLUTION TANK	Optional	Optional	Optional
CERTIFICATION	*	**	CE pending

CATALOG NO.	97585	97585C	97586
SERIES	D	A	D
SIZE	20” (51cm) Steel base	20” (51cm) Steel base	20” (51cm) Steel base
HORSE POWER	1-1/2	1-1/2	1-1/2
VOLTS	115V	115V	230V
AMPS	7	7	3.5
MANUAL SOLUTION TANK	Optional	Optional	Optional
CERTIFICATION	*	**	CE pending

* **

CONTROL #119875 CONTROL #119875

*This product conforms to ANSI/UL Standard 561.
**This product is certified to CAN/CSA Standard C22.2 No. 10.

All specifications are subject to change without notice.

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Tornado® Standard Warranty Program*	
Warranties do not cover components subject to normal wear or abuse and misuse, and have other limitations not specified here. For full details , contact your Authorized Tornado Distributor, Service Center, or the Tornado Technical Service Department.	**10 Years:** *All plastic tanks and rotationally-molded bodies*
	2 Years: *Parts on all Tornado and Tornado/Karcher cleaning equipment 1) 2)*
	1 Year: *Labor on all Tornado and Tornado/Karcher cleaning equipment 1) 2)*
	1 Year: *Warranty on batteries, one full year, not pro-rated.*

*** Effective January 1st, 2001. Terms subject to change without notice.**

1) Windshear™ Blower-Dryer, Insulation Blowers, CW 50, CW 100, and Duo-Upright Carpetkeepers™ are warranted for 1 (one) year for parts and labor.

2) Warranties on the ICC1, KMR 1200, KMR 1250, and KMR 1700 are 24 months parts/6 months labor OR 1000 hours of operation, whichever comes first. Warranties on the BR and BD 1000 are 24 months parts/12 months labor OR 1000 hours of operation, whichever comes first.

IMPORTANT SAFETY INSTRUCTIONS
FOR COMMERCIAL USE

WHEN USING AN ELECTRICAL APPLIANCE, BASIC PRECAUTIONS SHOULD ALWAYS BE FOLLOWED INCLUDING THE FOLLOWING:
READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE

WARNING: TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY:

Do not leave machine unattended when plugged in. Unplug from outlet when not in use and before changing pads or attempting any maintenance or adjustment. If handle switch lever is activated accidentally, high starting torque will cause machine to move and may cause damage or injury.

To avoid electrical shock, Use indoors only. Do not use outdoors and do not expose to rain.

Do not allow to be used as a toy. Close attention is necessary when used by or near children.

Use only as described in this manual. Use only manufacturer's recommended attachments.

Do not use with damaged cord or plug. If machine is not working properly, if it was dropped, damaged, left outdoors, or dropped into water, return it to a service center.

Do not pull or carry by cord, use cord as a handle, close a door on cord, or pull cord around sharp edges or corners. Do not run machine over cord. Keep cord away from heated surfaces. Do not unplug by pulling on cord. To unplug, grasp the plug not the cord. Do not handle plug or machine with wet hands.

Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.

Turn off all controls before unplugging.

Connect to a properly grounded outlet only. See Grounding Instructions.

Do not put hands under base - rotating parts could cause injury. Always keep hands feet and loose fitting clothing away from moving parts to prevent possible injuries. Use care to keep electrical supply cable from contacting moving parts, such as floor brushes or pads.

Risk of explosion: Floor sanding can result in explosive mixture of fine dust and air. Use this machine only in a well-ventilated area, free from any flame or match. Do not use machine in areas where flammable and/or explosive vapors or dusts are present. To avoid fires do not use with a flammable or combustible liquid to clean a floor.

Make sure voltage and frequency at the wall receptacle correspond with that indicated on nameplate before plugging in machine. A 20-amp circuit is recommended. Right or left switch levers will independently operate the motor.

Never use a device to lock the switch lever in the "ON" position.

Use only a 12 Ga. three-wire extension cable, which have 3-prong grounding type plugs and 3-prong receptacles that accept the plug of the machine.

Do not add weight to this machine - this will upset the balance and may cause motor overload.

Do not hop the brush or pad holder onto the machine.

SAVE THESE INSTRUCTIONS

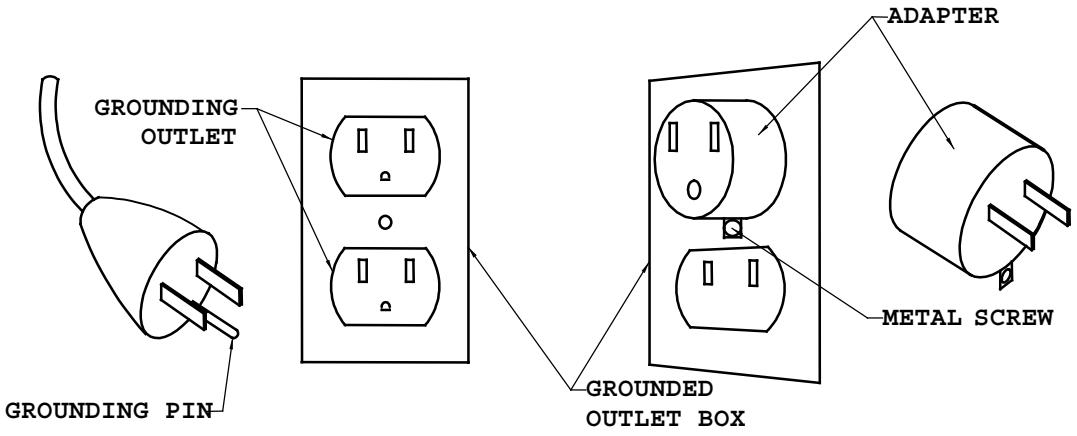
GROUNDING INSTRUCTIONS

This appliance must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk electric shock. This machine is equipped with a cord having an equipment -grounding conductor and grounding plug. The plug must be inserted into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

WARNING: Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or service person if you are in doubt as to whether the outlet is properly grounded. Do not modify the plug provided with the appliance - if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

This appliance is for use on a nominal 120-volt circuit, and has a grounding plug that looks like the plug illustrated in sketch A. A temporary adapter that looks like the adapter illustrated in sketches B and C may be used to connect this plug to a 2-pole receptacle as shown in sketch B if a properly grounded outlet is not available. The temporary adapter should be used only until a qualified electrician can install a properly grounded outlet (sketch A). The green-colored rigid ear, lug, or the like extending from the adapter must be connected to a permanent ground such as a properly grounded outlet box cover. Whenever the adapter is used, it must be held in place by a metal screw.

Note: In Canada, the use of a temporary adapter is not permitted by the Canadian Electrical Code.



SKETCH A SKETCH B SKETCH C

WHEN THE MACHINE IS DELIVERED

Check the carton carefully for signs of rough handling. Remove the machine from the carton and look for concealed damage. If the machine is damaged, notify the carrier immediately and request an inspection. Be sure to keep the carton, packing inserts, packing lists, and carrier's receipt until the inspector has verified your claim.

BEFORE OPERATING THE MACHINE

Read the manual carefully and completely before attempting to operate the unit. This manual has important information for the use and safe operation of the machine. **FAILURE TO ADHERE TO THESE INSTRUCTIONS COULD RESULT IN SERIOUS BODILY INJURY OF PROPERTY DAMAGE.** Keep this manual on file and handy. This machine will assure years of satisfactory service if operated and maintained according to recommendations in the manual. If additional information is needed, please contact your local distributor or write to:

TORNADO INDUSTRIES
7401 W. LAWRENCE AVE.
CHICAGO, IL 60706
708/867-5100
1-800-VACUUMS
FAX: 708/867-6968

All information and specifications printed in the manual and parts list are current at the time of printing. However, because of Tornado's policy of continual product improvement, we reserve the right to make changes at any time without notice.

WARRANTY

To protect your investment, promptly fill out the required information on the warranty card that comes with the unit and mail it back to Tornado Industries

Note: Service repair and warranty work is not normally handled at the factory.

WARNING

The machine was designed for use on floors as per instructions and recommendations written in this manual. Any deviation from its proper use or purpose and the consequential damage that may occur is the sole responsibility of the end user.

GENERAL PRECAUTIONS

- You must be trained in the operation of this machine before use. Please read this manual carefully and obtain operation instructions from your safety director or your authorized Tornado distributor.
- Always operate this machine with all of the cable removed from the handle. Failure to do so will upset the precision balance of the machine.
- Do not use the Floor Machine for scarifying or sanding.
- Care should be taken to keep cable away from rotating brush.
- Do not attempt to repair warranted machines. All repairs must be done by a qualified and authorized repair center. Non warranted repairs will be billed back to the owner of the unit.
- Do not use any replacement parts except those specified in the parts list. Unauthorized parts could cause the unit to malfunction and will void the warranty.

FAILURE TO COMPLY WITH THE ABOVE WARNING INSTRUCTIONS WILL VOID THE WARRANTY

EXTENSION CORD

If an extension cord is used, use only a three wire 12 gauge extension cord that has three prong grounding type plugs and three prong receptacles that accept the machines plug. Your Floor Machine is equipped with a 14-gauge power cord. Replace or repair all damaged cables.

PREPARING THE MACHINE

Your **Standard Floor Machine will require some assembly**. Refer to the Floor Machine Assembly Instructions section of this manual.

FLOOR MACHINE ASSEMBLY INSTRUCTIONS

- When you remove the machine from its carton, you will notice two major components, the handle assembly, and the base assembly. You will need a 9/16” box end wrench, a 3/4” box end wrench, and a 3/4” socket with ratchet driver to assemble the unit.
- Remove the handle tube pivot lock lever bolt and the 3/8-16 lock nut from the handle tube pivot lock bracket. Remove the 1/2-13 bolt, lock nut, and the 2 nylon spacers from the base assembly.
- Place the handle assembly in position (as shown). Swing handle tube pivot support arms up. Align holes with those in the handle tube pivot lock bracket. Insert pivot lock lever bolt and assemble 3/8-16 locknut - Do not tighten.
- Insert the two nylon spacers into the handle tube pivot hole located at the bottom of the tube. Align tube assembly pivot holes with the tube pivot/mounting hole in the base. Insert the 1/2-13 bolt through mounting holes and tube. Secure with the 1/2-13 lock nut.
- Tighten both nuts so that the handle pivots without any side play. Plug the motor cord securely into the handle tube cord.

PAD PLACEMENT/INSTALLATION INSTRUCTIONS

- Place pad on floor.
- Place pad holder on pad, bristle side down. Make sure pad overlaps pad holder uniformly.
- Turn over pad holder assembly by grasping pad and pad holder together.
- Mount pad holder assembly on machine.

ATTACHING BRUSH OR PAD HOLDER

Be sure cable is not plugged into wall outlet. To attach brush or pad holder, raise handle to upright position and tighten the handle tube clamp lever. Tilt machine back on wheels until handle rests on floor. Rotate brush or pad holder against coupler until the three lugs drop into place and turn counter-clockwise until locked. To remove, turn clockwise until lugs of coupler are free and then lift off. For long life and best results always use genuine Tornado accessories.

OPERATING THE FLOOR MACHINE

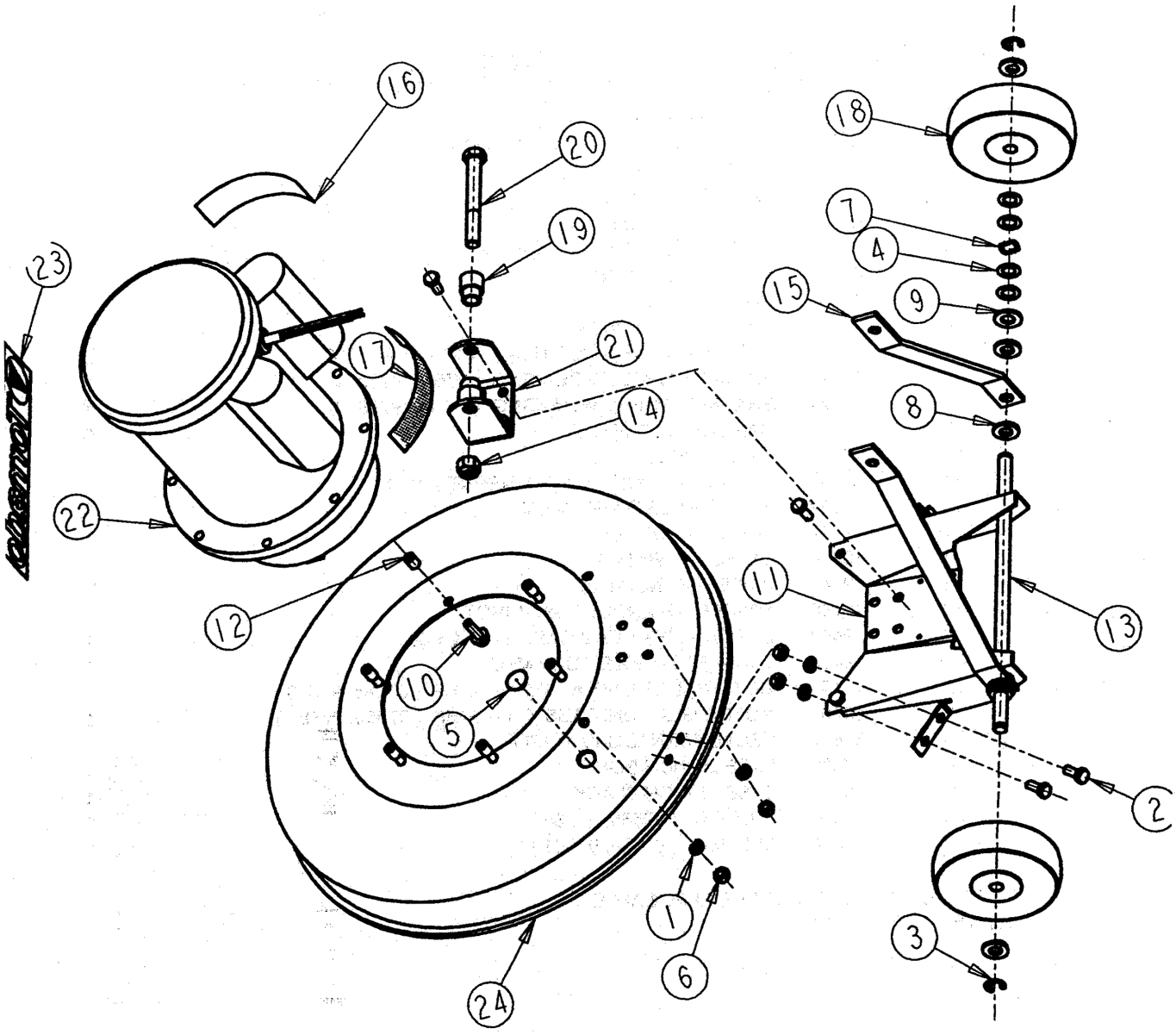
- To adjust handle to desired height, loosen clamp lever, adjust handle to desired height, and tighten clamp lever.
- Plug cable to wall receptacle making sure the voltage and frequency correspond with that indicated on nameplate.
- THE LOCKOUT LEVER MUST BE PUSHED FORWARD FROM THE OPERATORS POSITION TO UNLOCK SWITCH LEVERS. Right or left switch levers will independently operate motor.
- Raising or lowering handles lightly controls movement of machine in operation. Raise handle to travel to the right. To make it travel to the left, lower the handle.
- Floor Machine when used for wet scrubbing and stripping. Apply cleaning or stripping solution directly to floor surface with a mop. Scrub surface with the proper brush or pad. Be sure the surface does not dry before recovery of solution. Recover solution with wet/dry vacuum.
- Floor Machine when used for polishing and spray buffing. Before either procedure, clean the floor surface. Polishing or burnishing is a dry procedure. Use proper brushes or pads. Spray buffing with either an aerosol system or hand held trigger sprayer, the spray buff solution should be applied away from the machine. For best results spray buff material should be buffed out within two to three passes.
- The 98619 17” Pad Holder is recommended for hard floor maintenance and for bonnet carpet cleaning.
- The 94717 17” Foam Feed Shampoo Brush is recommended for carpet shampooing.
- The 97790 4-1/2-gallon Manual Solution Tank is available for all DS Series Floor Machines. The 97790 is furnished with is own Assembly and Operating Instructions.

DAILY OR REGULAR MAINTENANCE

***WARNING OF POTENTIAL INJURY - MOVING PARTS*: To Reduce the Risk of Injury, Unplug before Servicing.**

- Check the condition of the floor pad or brush, replace when necessary. Pad holders and brushes must be properly maintained to insure maximum cleaning results.
- Wipe the entire machine down with a general purpose cleaner.
- Raise the handle tube in the up storage position.
- Wipe down the cord when wrapping the power cord for storage. Tuck the last 12” of the cord through the wrapped cord. Do not make a knot at the plug end.
- Store the Floor Machine in an upright position. Do not store with Brush and/or Pad Holder mounted on machine.
- Check for cable damage and repair if necessary.
- After using solution tank, remove the feed tube from the base and drain solution. This simple maintenance will insure long valve life and ease of operation.

DS SERIES 1-1/2 HP EXPLODED VIEW
BASE ASSEMBLY

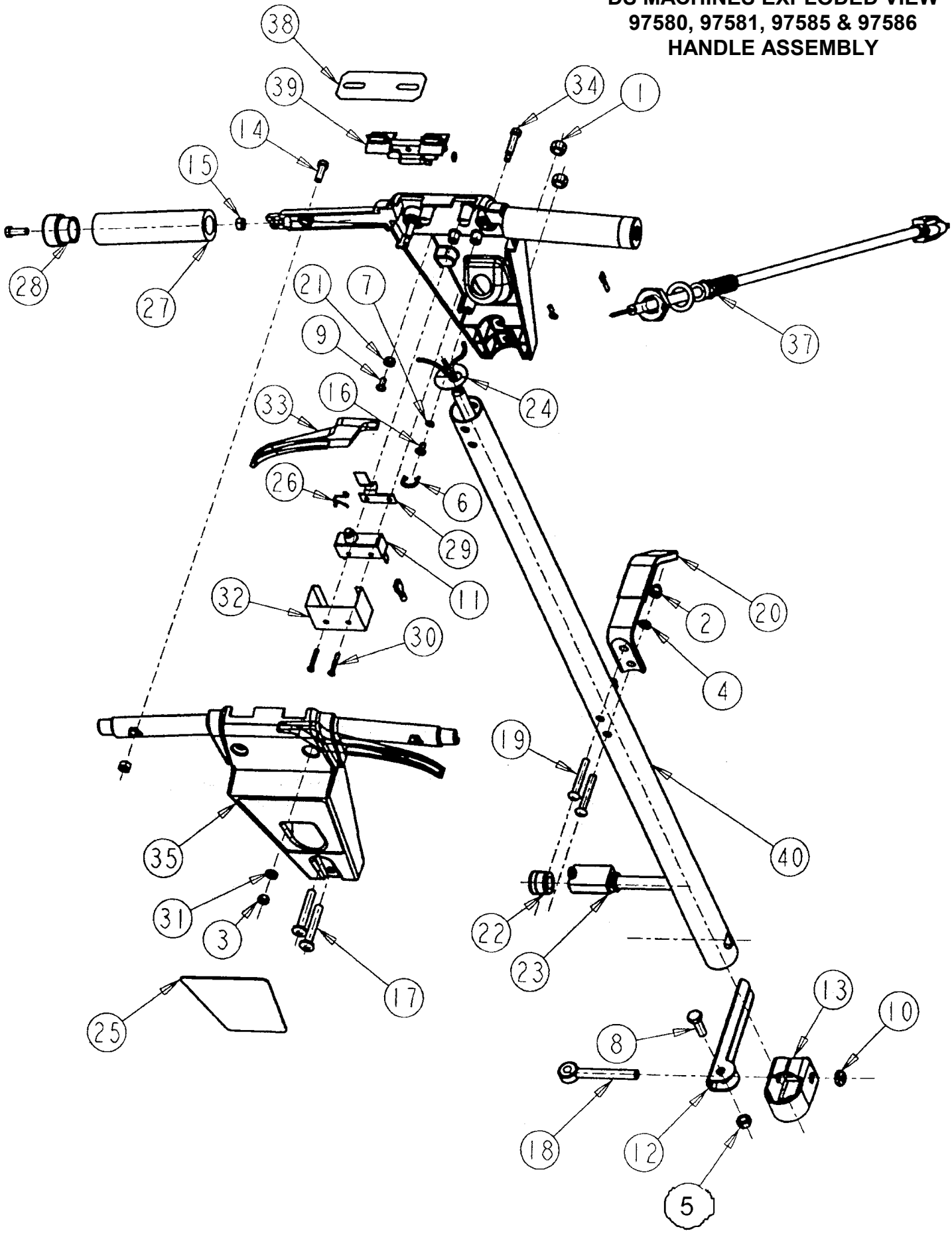


DS SERIES 1-1/2 HP FLOOR MACHINES
97580, 97580C, 97581, 97585, 97585C & 97586
BASE ASSEMBLY

ITEM NO	PART NO	DESCRIPTION	QTY
1	01577	WASHER LOCK 5/16	10
2	02109	SCREW HEX HEAD CAP 5/16 -18 X ¾	10
3	03470	RING RETAINING EXT.	2
4	03658	WASHER-PLAIN .500	8
5	04054	PLUG HOLE 11/64	1
6	07719	NUT – FINISHED HEX 5/16 – 18	10
7	07723	WASHER – S PRING ½	2
8	12554	WASHER – PLAIN ½	6
9	16581	WASHER – PLAIN ½	2
10	17617	SCREW – HEX FLANGE HEAD 5/16 – 18 X 1.000	6
11	17620	BRACKET WHEEL MOUNTING (97585, 97585C, 97586)	1
*	17621	BRACKET WHEEL MOUNTING (97580, 97580C, 97581)	1
12	18593	CAP SCREW THREAD	6
13	19335	AXLE – WHEEL	1
14	19337	NUT – HEX LOCK (NYLON INSERT) ½ -13	1
15	19339	ARM HANDLE TUBE PIVOT	2
16	19347	LABEL – CAUTION	1
17	19364	LABEL – WARNING	1
18	19447	WHEEL – 5 INCH DIA.	2
19	19448	SPACER – H ANDLE TUBE PIVOT	2
20	19449	SCREW – HEX HEAD CAP ½ -13 X 4.00	1
21	19450	BRACKET HANDLE TUBE MTG.	1
22	31034	MOTOR/GEAR UNIT ASS'Y 1 - ½ HP 115V (97580, 97580C, 97585 & 98585C)	1
*	31035	MOTOR/GEAR UNIT ASS'Y 1 - ½ HP 230V (97581, 97586)	1
23	30817	DECAL TORNADO W/ LOGO	1
24	30836	BASE 20 INCH BLACK	1
*	30835	BASE 17 INCH BLACK	1
(25)	11094	BUMPER (97585, 97585C, 97586)	1
*	18578	BUMPER (97580, 97580C, 97581)	1

* ITEMS TO BE USED WHERE APPLICABLE
( ) ITEM NOT SHOWN

DS MACHINES EXPLODED VIEW
97580, 97581, 97585 & 97586
HANDLE ASSEMBLY

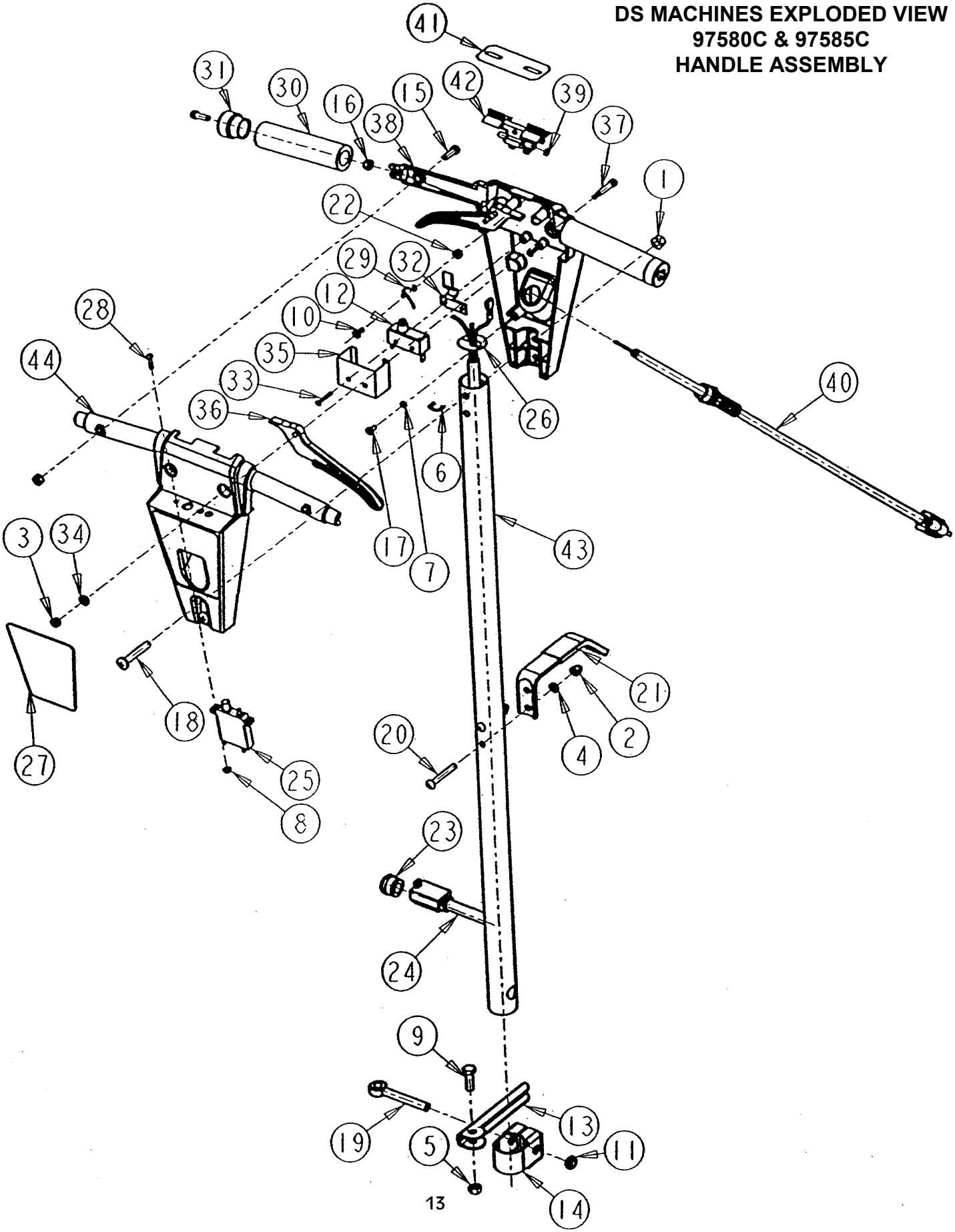


DS SERIES FLOOR MACHINES
97580 & 97585 (115V), 97581 & 97586 (230V)
HANDLE ASSEMBLY

ITEM NO	PART NO	DESCRIPTION	QTY
1	00067	NUT-HEX.LOCK(KEPS) 5/16-18	2
2	00685	NUT-ACORN 1/4-20(NICKEL)	2
3	01477	NUT-FINISHED HEX #10-24 (ZP)	2
4	01574	WASHER-LOCK(H/S)1/4"	2
5	01589	NUT-FINISHED HEX 5/16-18 (ZP)	1
6	01608	RING-HOG	1
7	01713	WASHER-LOCK(H/S)#10	2
8	03361	SCREW-HEX HD CAP 5/16-18 X 1.00 (ZP)	1
9	03660	SCREW-PHIL. PAN HD MACH #10-24 X 7/16 (ZP)	1
10	03868	NUT-HEX JAM LOCK (NYL) 3/8-16 (ZP)	1
11	06685	SWITCH, PUSH BUTTON 20AMP S.P.N.O.	1
12	07525	LEVER-HANDLE TUBE CLAMP	1
13	07526	BRACKET-HNDL.TUBE CLAMP	1
14	07532	SCREW-PHIL. FILLISTER HD 1/4-20 X 3/4 (ZP)	4
15	07533	NUT-HEX.LOCK(P/T) 1/4-20	4
16	07534	SCREW-PHIL. FLAT HD TAPT #10-32 X 3/8 (ZP)	2
17	07536	SCREW-PAN HEAD 5/16-18 X 2"	2
18	07547	PIVOT-HANDLE TUBE CLAMP LEVER	1
19	10398	SCREW-PHIL. RND HD MACH 1/4-20 X 1-7/8 (ZP)	2
20	10407	ASSEMBLY-CABLE HOOK	1
21	10894	NUT-HEX.LOCK(P/T) #10-24	1
22	12047	STRAIN RELIEF BUSHING	1
23	14545	CORD-HANDLE TUBE (115V) 14/3 GA.X 46"(FEM.BLACK)	1
24	15226	STRAIN RELIEF WASHER (HANDLE TUBE)	1
25	16170	NAMEPLATE, HANDLE	1
26	17157	SPRING – LEVER LOCK RETURN	1
27	17162	GRIP HANDLE	2
28	17163	HANDLE – PLUG	2
29	17165	SPRING – SWITCH ACTUATION	1
30	17167	SCREW-TCT (T) P.H. #6-32 X 1	2
31	17245	WASHER-PLAIN 17/64 ID (ZP)	4
32	17900	SWITCH COVER	1
33	18969	LEVER-SWITCH ACTUATION	2
34	18991	LEVER-SWITCH ACTUATION 1/4D X 1.00 (ZP)	2
35	18996	HANDLE-F/M	2
36	19211	WASHER – PLAIN .252	1
37	19462	ASSY-PWR. CORD,115V,METAL(F/M'S) 50' CORD **(97580 & 97585)**	1
*	19458	ASSY-PWR. CORD,230V,METAL(F/M'S) 50' CORD **(97581 & 97586)**	1
38	19615	ESCUTCHEON-LOCK LEVER	1
39	19651	LEVER LOCK(STARTGUARD)	1
40	30859	TUBE-HANDLE (DS)	1
(42)	14413	DECAL-"WARNING READ OPERATION"	1
(43)	31271	DECAL-"WARNING TO REDUCE THE RISK"	1
(44)	17154	DECAL-"TO OPERATE MACHINE"	1
(45)	06824	TERMINAL-CLOSD.END CRIMP	1
(46)	30813	DECAL-LOGO "SWIRL"	1

* ITEMS TO BE USED WHERE APPLICABLE
( ) ITEMS NOT SHOWN

DS MACHINES EXPLODED VIEW
97580C & 97585C
HANDLE ASSEMBLY



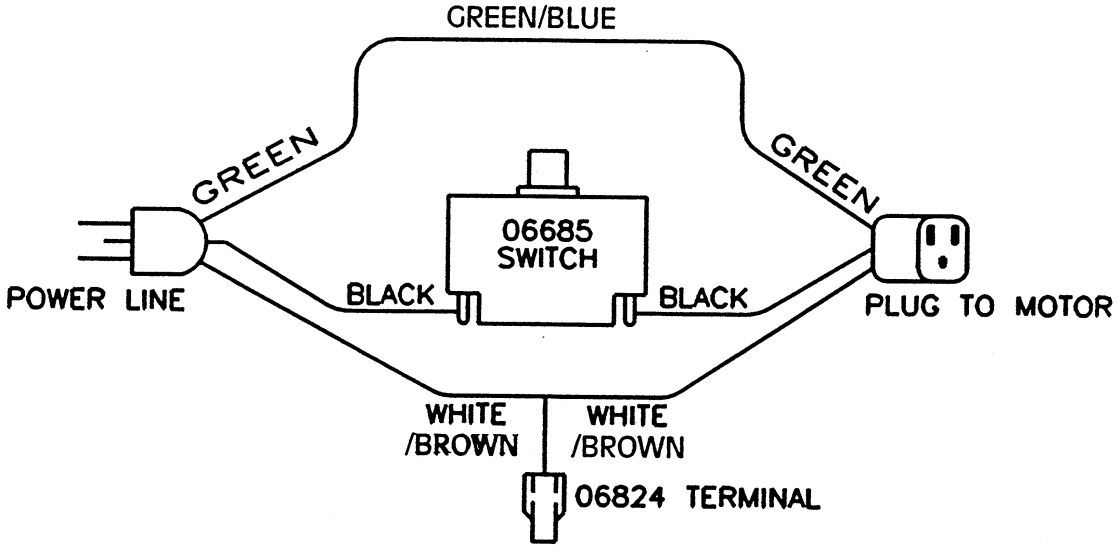
DS SERIES FLOOR MACHINES
97580C & 97585C (115V)
HANDLE ASSEMBLY

ITEM NO	PART NO	DESCRIPTION	QTY
1	00067	NUT-LOCK 5/16-18	2
2	00685	NUT-ACORN 1/4-20 (NICKEL)	2
3	01477	NUT-FINISHED HEX #10-24	2
4	01574	LOCK WASHER 1/4"	2
5	01589	NUT-FINISHED HEX 5/16-18	1
6	01608	RING-HOG	1
7	01713	WASHER-LOCK (H/S) #10	2
8	02958	NUT-HEX LOCK (KEPS) #6-32	2
9	03361	SCREW-HEX HEAD CAP 5/16-18 X 1.000	1
10	03660	SCREW-PHILLIPS PAN HEAD MACHINE #10-24 X 7/16	1
11	03868	NUT-HEX JAM LOCK (NYLON INSERT) 3/8-16	1
12	06685	SWITCH BUTTON	1
13	07525	LEVER HANDLE TUBE CLAMP	1
14	07526	BRACKET-HNDL. TUBE CLAMP	1
15	07532	SCREW-PHILLIPS FILLISTER HEAD MACHINE 1/4-20 X 3/4	4
16	07533	NUT HEX LOCK (P/T) 1/4-20	4
17	07534	SCREW-PHILLIPS PAN HEAD TAPTITE #10-32 X 3/8	2
18	07536	SCREW, PHILLIPS PAN HEAD MACHINE	2
19	07547	PIVOT-HANDLE TUBE CLAMP	1
20	10398	SCREW-PHILLIPS ROUND HEAD MACHINE 1/4-20 X 1-7/8	2
21	10407	ASSEMBLY-CABLE HOOK	1
22	10894	NUT-HEX LOCK (P/T) #10-24	1
23	12047	STRAIN RELIEF BUSHING	1
24	14545	CORD-HANDLE TUBE	1
25	15195	CIRCUIT BREAKER (15A)	1
26	15226	STRAIN RELIEF WASHER	1
27	16170	NAMEPLATE, HANDLE	1
28	16924	SCREW-PAN HEAD (PHILLIPS) #6-32 X 3/4"	2
29	17157	SPRING-LEVER LOCK RETURN	1
30	17162	GRIP HANDLE	2
31	17163	HANDLE-PLUG	2
32	17165	SPRING-SWITCH ACTUATION	1
33	17167	TCT PAN HEAD MACHINE SCREW	2
34	17245	WASHER-PLAIN 17/64	4
35	17900	SWITCH COVER	1
36	18969	LEVER-SWITCH ACTUATION	2
37	18991	SCREW-SOCKET HD SHOULDER 1/4D X 1.00	2
38	18996	HANDLE-F/M (CASTING)	1
39	19211	WASHER-PLAIN .252	1
40	19462	ASSEMBLY-POWER CORD, 115V, METAL	1
41	19615	ESCUTCHEON-LOCK LEVER	1
42	19651	LEVER LOCK (STARTGUARD)	1
43	30859	HANDLE TUBE	1
44	31206	HANDLE-F/M (CASTING/MACHINED PART)	1
(45)	14413	DECAL-"WARNING READ OPERATION"	1
(46)	31271	DECAL-"WARNING TO REDUCE THE RISK"	1
(47)	17154	DECAL-"TO OPERATE MACHINE"	1
(48)	06824	TERMINAL-CLOSED-END CRIMP (F.I.)	1
(49)	30813	DECAL-LOGO "SWIRL" 2.125 DIA. BLACK	1
(50)	16424	LEAD WIRE 14GA X 4" BLACK	1

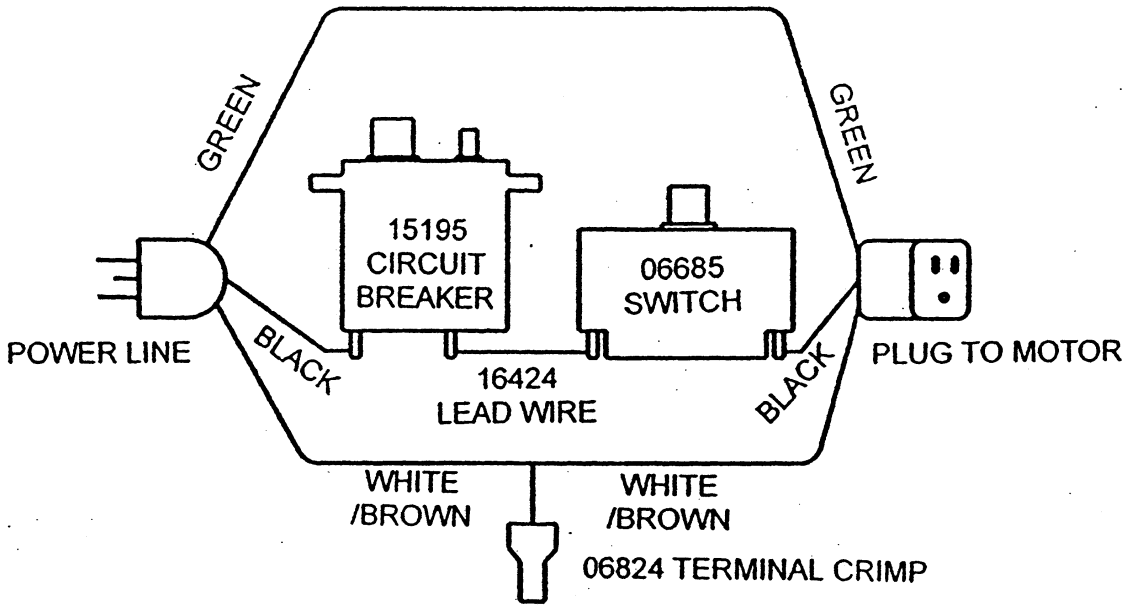
( ) ITEMS NOT SHOWN

Common Options and Attachments For the DS Series of Floor Machines

Part No.	Description
97790	4.5 Gallon Solution Tank
94300	Brush Yoke Only
98619	17” Pad Holder
98118	17” Poly. Scrub Brush
94717	17” Nylon Shampoo Brush
98620	20” Pad Holder
98538	20” Poly. Scrub Brush
94917	20” Nylon Shampoo Brush



97580, 97581, 97585, 97586 WIRING DIAGRAM



97580C & 97585C WIRING DIAGRAM